



542 Chem



Master of Science in Chemistry (M.Sc.)

**Selected Topics in Organic Chemistry
(Total Synthesis of Bioactive compounds)**



Course Description

In this teaching unit, strategies and selective methods to access natural and/or synthesis of bioactive complexes molecules are presented as well as the mechanisms of the reactions. Syntheses of antitumor and/or anticancer agents, antibiotics and molecules active on the nervous central system are described. The course is naturally oriented towards Molecular Chemistry specialization, as well as all the courses at interfaces for which synthesis is involved (molecular materials, monomer preparation etc...).



References



1. D.S. Johnson, J.J. Li, The art of drug synthesis, Yohn Wiley & Sons, 2007.
2. Ž. Čeković: Principi organske sinteze, Naučna knjiga Beograd, 2006.
3. J. J. Li, D. S. Johnson, D. R. Sliskovic, B. D. Roth, Contemporary Drug Synthesis, Wiley Interscience, 2004.
4. R. Silverman, The Organic Chemistry of Drug Design and Drug Action, 2nd Ed. Academic Press, 2004.
5. K. Faber, Biotransformations in organic chemistry, 3rd Ed. Springer-Verlag, 1997.

Course Content

No	List of Topics	Contact Hours
1	Introduction to the synthetic chemistry of bioactive compounds	4
2	Stages of research - from idea to production	4
3	Examples of the synthesis of organic compounds with different biological activity:	
4	<ul style="list-style-type: none">- Anticancer compounds- Antibiotics- Antifungal compounds- Compounds against influenza- Compounds against cardiovascular disease and disease of metabolism- Compounds against diseases of the central nervous system	12
5	<ul style="list-style-type: none">- Michael Addition Reactions of α-β-unsaturated heterocyclic compounds and Their Biological Activities- Synthesis of Barbituric acid derivatives and their biological applications- Synthesis of <u>Spiroindolone</u> Analogues and their Applications as Potential Hypoglycemic- Some Applications based on Aldol Condensation Reactions of some heterocyclic Compounds.- The use of microorganisms in the synthesis of bioactive compounds	4
Total		24



Course Learning Outcomes

- ▶ To enhance the knowledge in the major organic synthesis methods by learning how to synthesize bioactive compounds from the chiral pool or commercially available molecules.
- ▶ To understand the scientific level of the organic synthesis as well as the bioactivity of organic molecules.
- ▶ To enhance the awareness about pharmaceutical applications of some bioactive compounds.
- ▶ To devise the retrosynthetic analysis of a defined molecule target as well as its synthesis
- ▶ To explain the chemo-, the stereo- and the enantioselectivity of the reactions, as well as the mechanisms of the key steps

Schedule of Assessment Tasks for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Major exam I	Week 6	20%
2	Major exam II	Week 12	20%
3	Quiz, activities and seminars	Week 3-15	20%
4	Final Exam	Week 16	40%